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Self-Regulated Learning in Middle School Agricultural Education: Teachers' Perspectives on Facilitating Quality Student Learning for Supervised Agricultural Experiences

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Abstract

Supervised agricultural experiences (SAE) have been a core tenet of school-based agricultural education. Despite this, limited evidence has existed regarding the best practices associated with facilitating quality student learning for SAEs at the middle school level. In response, we used self-regulated learning as a lens to examine this deficiency. Leaders of agricultural education from states with the highest middle school agricultural education enrollment and FFA membership nominated exemplary teachers to participate in this study. The qualitative data was analyzed and interpreted through five themes: (1) an eye toward the future, (2) competition as a method of instruction, (3) goal-driven learning outcomes, (4) accountability for student learning, and (5) challenges to facilitating student learning in middle school SAEs. The findings illustrated how the exemplary teachers navigated various contextual and structural challenges to facilitate high-quality learning for middle school students through SAEs. Documenting these practices was a vital step to reimagining SAEs for middle school agricultural education programs. This knowledge could also be used to reposition agricultural education to create a more developmentally appropriate framework that guides the facilitation of learning for middle school SAEs. In the future, research should seek to establish indicators of high-quality SAE programs at the middle school level.

Introduction and Review of Literature

Since its early foundation, project-based learning (PBL) has been a core tenet of school-based agricultural education (SBAE). For example, Rufus Stimson, an early leader of SBAE, introduced the home project method for SBAE students to complete agricultural improvement projects at their farms to gain more profound knowledge of the agricultural industry (Stimson, 1919). The home project method eventually evolved into what has become known as supervised agricultural experiences (SAEs) in SBAE and was likely the first component of agricultural education's comprehensive, three-circle model (Croom, 2008). SBAE was formalized after the adoption of The Smith-Hughes Act (1917). However, participation in SBAE programs was limited to males aged 14 years or older. It was not until years later that middle

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school agricultural education programs emerged. Agricultural education courses were first reported for 8th Grade students in Virginia in 1926 (Rossetti & McCaslin, 1994). Over time, middle school agricultural education programs continued to emerge across the U.S., including 7th Grade programs in Vermont in 1930 and 6th Grade programs in Mississippi in 1974 (Rossetti & McCaslin, 1994).

Further, the National FFA Organization experienced a major demographic shift in 1988 when FFA membership was granted to middle school students (National FFA Organization, 2022). The adoption of middle school agricultural programs and membership in the National FFA Organization created a need for a middle school agricultural education curriculum, middle school FFA award programs, and middle school SAEs. One recent initiative that has provided a guiding framework for this practice was *SAE for All* (The National Council for Agricultural Education [NCAE], 2017). The goal of *SAE for All* was 100% engagement in SAEs for all students – from middle to high school (The National Council for Agricultural Education, 2012). Many students, especially at the middle school level, begin with a Foundational SAE. Foundational SAEs provide an entry point for students by which they can (a) explore careers, (b) gain critical employability skills, (c) engage in personal financial management, (d) research the importance of workplace safety, and (e) enhance their agricultural literacy (NCAE, 2017). Eventually, as students advance in SBAE, they can engage in Immersion SAEs to "enrich their agricultural education" (NCAE, 2017, p. 5).

Historically, Immersion SAEs have been rooted in placement projects by which students have been employed in the agricultural industry, or entrepreneurial projects, that allow them to own an agricultural enterprise (Phipps et al., 2008). However, Immersion SAE programs have expanded to include (a) research, by which students employ the scientific method to solve a problem, (b) school-based enterprise, an SAE program that allows students to utilize school facilities to create agricultural businesses, and (c) service-learning, a project-based learning experience that promotes students to develop a self-directed, agriculturally-themed service project tied to curriculum-based standards (The National Council for Agricultural Education, 2017).

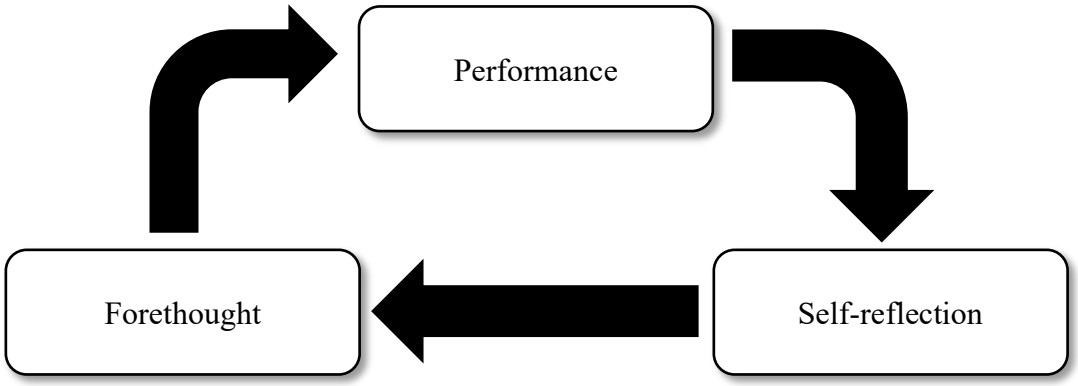
SBAE teachers have agreed that SAE programs were a vital component of agricultural education's comprehensive three-circle model; however, implementation of quality SAE programs has been reported to be lacking (Lewis et al., 2012; Wilson & Moore, 2007). For example, Lewis et al. (2012) reported that many SBAE students were unaware of the major SAE categories. Further, some previous research (Retallick, 2010; Wilson & Moore, 2007) has suggested that SBAE teachers experienced challenges regarding integrating SAEs into their programs due to (a) lack of rewards, (b) barriers to successful integration, and (c) inconsistencies across student dynamics. Retallick (2010) also suggested that an incongruence existed between the theory of SAE programs and the practices teachers used to incorporate SAEs into their programs. To this point, the National Council of Agricultural Education (2015) argued that supervision by teachers and other adult mentors was essential to SAE program quality. Teachers have been found to positively influence students' engagement, leading to greater student confidence and ability to develop and implement their SAE programs (Rubenstein et al., 2016). To develop exemplary SAE programs, teachers must provide clear student expectations (Rubenstein & Thoron, 2015). Further, when teachers have mandated SAE as a graded component, students were driven to be more successful (Bryant et al., 2022). Lewis et al. (2012) also suggested that assigning a grade value to an SAE program increased student participation.

SAE programs have become a required educational experience of SBAE (The National Council for Agricultural Education, 2015). Through SAEs, students develop critical employment skills that can be applied to various careers in the agricultural industry. Further, The National Council for Agricultural Education (2015) has maintained that "exploration of career interests, requirements, and opportunities within a chosen career pathway in AFNR is a key component of quality SAE" (p. 4). These quality factors, however, may not be appropriate for students at the middle school level. As an illustration, many middle school students have only begun exploring career options but have not established firm career goals

(Roberts, 2003). As such, Roberts (2003) suggested that middle school students pursue foundational-type SAE programs that focus on career exploration and agricultural literacy. Despite this, limited empirical evidence has supported such a claim. Consequently, the following question has persisted: Is the modern structure and philosophy guiding SAEs relevant to middle school agricultural education?

Figure 1

Zimmerman's (1998, 2008) Theory of Self-Regulated Learning



Theoretical Framework

The theory of self-regulated learning (Zimmerman, 1998, 2008; see Figure 1) emerged as the most appropriate lens during data analysis and theme negotiation to interpret the findings of this investigation. Through this lens, learning is depicted as a three-phase cycle – (1) forethought, (2) performance, and (3) self-reflection – that individuals use to understand and adapt their environment to achieve a desired learning outcome (Zimmerman, 1998, 2008).

Forethought refers to "influential processes and beliefs that precede efforts to learn and set the stage for such learning" (Zimmerman, 1998, p. 2). Zimmerman (2008) delineated forethought into two categories (1) task analysis and (2) self-motivation beliefs. Task analysis includes critical duties such as goal setting in which individuals create a strategy to enhance their learning – an undertaking heavily influenced by their motivational beliefs. As such, in this phase, learners assign value to a task or skill, assess their outcome expectations of the achievement envisioned, and evaluate their self-efficacy to perform the new skill.

These motivational beliefs reflect students' commitment to achieving a goal and influence their success in the second phase of the cycle: performance. The three categories of performance include: (1) attention focusing, (2) self-instruction, and (3) self-monitoring to help learners focus on a task to achieve a goal. Finally, in the self-reflection phase, self-regulated learners employ self-evaluation techniques to assess their learning and outcome attainment and analyze strategies they employ to meet their goals through self-assessment (Zimmerman, 2008). Limited research has been published regarding self-regulated learning in SBAE. However, McKendree and Washburn (2017) examined agricultural education teachers' awareness and perceptions of self-regulation strategies as learners as well as how those teachers fostered self-regulated learning in their students. In the current investigation, self-regulated learning emerged as a useful theory to help interpret the findings, emerge themes, and assign meaning to the beliefs espoused by middle school agricultural education teachers. Framing our interpretation of the emergent findings through self-regulated learning, therefore, appeared to provide insight into their effective teaching and learning strategies and to establish a greater educational value to SAEs for their middle school students.

Purpose of the Study

This study's purpose was twofold: (1) explain how middle school agricultural education teachers have successfully facilitated student learning through SAE programs, and (2) describe best practices for SAE programs at the middle school level. The research question for this study was: What SAE delivery and supervision approaches have been utilized by exemplary middle school agricultural education teachers to facilitate student learning?

Methodology

This study used an interpretive qualitative design to facilitate data collection and analysis (Merriam, 2009). Interpretive designs seek to describe how individuals construct knowledge as they make sense of their social world (Merriam, 2009). Therefore, this investigation was framed from a constructionism epistemological perspective (Koro-Ljungberg et al., 2009). Through the worldview of constructionism, meaning emerges as an individual interacts with their social environment (Crotty, 1998). Using this framing, we made sense of how exemplary middle school teachers facilitated quality student learning through SAEs. However, during this process, we recognized that our lived experiences influenced the interpretation of the findings (Merriam, 2009). As such, it was critical to address our personal biases and subjectivity.

Each investigator previously served as an agricultural education instructor. During the lead researcher's career as a middle school teacher, he incorporated SAE programming using a variety of methods, largely through the introduction of middle school students to agriscience research SAE projects. The philosophy behind this was twofold: (1) to introduce middle school students to FFA and SAE, including all aspects of research and data management, and (2) to establish a project developed around individual student interest that motivated students as they advanced through the agricultural education program. Because of these experiences, he became interested in middle school agricultural education programs and expanding opportunities for this population. Therefore, a bias that each of us brought to the study was that we perceived that SAEs were positive learning experiences for middle school students. As such, we attempted to mitigate such biases whenever possible.

We implemented a combination of purposeful and snowball sampling procedures to select participants for this study, which allowed us to access whether participants met the requirement of being a middle school teacher who facilitated exemplary SAE programs (Creswell & Poth, 2018). Jones et al. (2020) indicated the states with the highest middle school enrollment and FFA membership, which included: (1) Georgia, (2) Florida, (3) Virginia, (4) Missouri, (5) Delaware, (6) Oklahoma, and (7) Wisconsin. We also contacted the National FFA Organization (2023a, 2023b) who provided data on middle school FFA members, which corroborated the findings of Jones et al. (2020). With this knowledge, we were confident that we pursued U.S. states with the highest middle school enrollment and FFA membership for this investigation.

Thereafter, we contacted the state leaders of agricultural education from these seven states and asked them to nominate middle school agricultural education teachers who they considered to be exemplary regarding the facilitation of middle school student learning through SAEs. In our official correspondence with the seven state leaders of agricultural education, we requested that they nominate teachers from their state using the following criteria: (a) taught at the middle school level, and (b) facilitated exemplary SAEs for middle school students that were rigorous, graded, and recognized at the state and local levels for their quality.

Despite multiple communication attempts, the teachers from Florida who were nominated by state leaders failed to respond. Further, the Missouri state leaders of agricultural education reported that middle

school students were not granted FFA membership; therefore, they could not provide quality recommendations because they had no data on middle school SAEs. As a result, Florida and Missouri were omitted from the study. The two middle school agricultural education teachers from the list of nominees from each respective state leader received a personal email with information about the study, along with participant consent. Each participant agreed to participate (see Table 1).

Table 1

Participants' Personal and Professional Characteristics

Participant	State	Years Teaching	Middle School Grades Taught	Certification
1	DE	16	6-8	Traditionally Certified
2	DE	4	6-8	Traditionally Certified
3	GA	4	6-8	Traditionally Certified
4	GA	14	6-8	Traditionally Certified
5	OK	13	8	Traditionally Certified
6	OK	10	8	Traditionally Certified
7	VA	2	6-8	Traditionally Certified
8	VA	35	6-8	Traditionally Certified
9	WI	1	8	Traditionally Certified
10	WI	28	6-8	Alternatively Certified

After obtaining Institutional Review Board (IRB) approval, semi-structured interviews were conducted with 10 participants. The interview questions were developed based on the purpose of the study. The lead researcher conducted all interviews using Zoom, a virtual meeting platform. The platform provided video, audio, and transcription files upon completion of the interview, all of which were saved using password-protected software. The transcription was reviewed for accuracy against the original audio files. To triangulate the findings of this investigation, the participants also provided documentation of the policies and practices they used to facilitate SAEs for middle school students. For instance, when the participants mentioned documents that they used to facilitate SAE middle school programs, such as (a) information sheets, (b) rubrics, and (c) assignments and relevant activities, the lead researcher noted such and participants were asked to provide these documents through follow-up correspondence.

Saldaña (2021) described coding as "a word of short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (p. 5). He further explained that the coding process allowed a researcher to attribute meaning to data sources for analytic processes to make sense of participants' experiences. For this study, we employed two methods of first-cycle coding: (1) in vivo coding, which utilizes words or phrases from the participants' lexicon that allowed us to draw connections from the participants' language throughout each transcript, and (2) values coding that allows researchers to consider a participants' values, beliefs, and attitudes about a particular topic (Saldaña, 2021). We employed values coding to understand participants' beliefs regarding middle school SAEs and why they incorporated such into their programs. After reducing the first-cycle codes, axial

coding was employed to categorize the first-cycle codes based on similarities. First cycle codes were completed by the lead researcher, and through peer negotiation by all researchers in this investigation, themes were consolidated, resulting in four final themes. Emerging themes through peer negotiations allowed us to construct meaningful categories based on participant responses (Saldaña, 2021). During the negotiation phase, self-regulated learning emerged as the most appropriate lens to interpret the study's findings because it allowed us to authentically represent participants' values while grounding our work theoretically (Zimmerman, 1998, 2008)

Lincoln and Guba (1985) outlined four standards of trustworthiness that we employed in this study: (1) confirmability, (2) dependability, (3) transferability, and (4) credibility. Confirmability refers to a researcher's explicitness regarding their decisions, biases, and other influences that can affect the study. We upheld confirmability by (a) providing a reflexivity statement, (b) a complete description of procedures for data collection, and (c) connections between conclusions and data. To uphold dependability, which refers to the degree to which the investigation was conducted consistently over time, we developed straightforward research questions and collected data across appropriate settings. The third standard, credibility, refers to the context in which data were collected. As such, we employed credibility by triangulating data across multiple sources, identifying uncertainties, and ensuring the data provided by participants made sense in the study's context. The fourth standard, transferability, indicates how the study's findings fit within other contexts. To ensure the findings in this study were transferable, we (a) fully described the participants to ensure accurate comparisons, (b) clearly described how participants were selected, and (c) linked the data to emerging theories.

Findings

After a thorough analysis of the data provided by the exemplary middle school teachers, five themes emerged: (1) an eye toward the future, where the teachers in this investigation incorporated goal setting through SAE as a learning tool to propel students to their next steps; (2) competition as a method of instruction, in which teachers used a competitive environment to motivate students to engage in high-quality learning experiences; (3) goal-driven learning outcomes, a theme by which teachers noticed student and school growth through participation in SAEs; (4) accountability for student learning, where teachers discussed checkpoints and benchmarks to encourage success in student goal achievement; and, (5) challenges to facilitating student learning in middle school SAEs, which outlined the barriers that detracted from providing valuable SAE learning experiences for middle school students. Ultimately, these findings illustrated how exemplary teachers navigated various contextual and structural challenges to facilitate learning for middle school students through SAEs.

Theme # 1: An Eye Toward the Future

Through the lens of self-regulated learning theory, having students assign value to learning tasks can enhance their understanding of concepts. When students value their learning tasks, they are more committed to their learning goals (Zimmerman, 2008). Therefore, to enhance students' motivation to achieve a goal, educators can help their students understand how a learning task directly impacts their lives. The middle school agricultural education teachers in this investigation understood the importance of helping their students find value in their learning through SAEs. To achieve this, participants reported using long-term planning, often multiple years into the future, as a motivational approach to encourage their students to engage in high-quality, sustained learning and prepare them for life in the real world. For example, Participant #3 expressed: "We talk about SMART goals [in class] along with an assignment to come up with five SAE ideas [the students could incorporate as an SAE program]. Further, Participants #1, #2, #7, and #10 also indicated that most of their middle school students' SAEs were "foundational" to help prepare them for deeper learning in high school agricultural education and their future careers. On this point, Participant #1 shared that they "align[ed] their expectations [to prepare students for] high school" and to

"…give my 8th graders an idea of what they're in for [in high school]." Case in point, Participant #2 shared: "if [students] have a haying operation at home, I tell them about the opportunities at the high school where [students] can run a haying operation through the school."

The middle school teachers also explained that as students progressed to high school, they intended to increase the rigor and scope of their learning through SAEs to ensure they could successfully address complex issues and problems. For example, Participant #3 facilitated school-based agricultural mechanics SAE projects in their middle school program. They stated: "[Students] can only build a birdhouse for an ag mechanics project in the 6th grade [in my program]. I expect a bit more out of a 7th grader than a 6th grader, because [a student] has a little bit more experience in terms of woodworking. I want to see more." To pace students appropriately, each of the teachers described using a scaffolding approach to student learning in SAEs by which their students initially acquired basic awareness of content in agriculture to provide them with the foundational knowledge and skills needed to engage with more issues and problems more intimately later in their academic careers. Further, the middle school teachers described how they kept expectations similar for all students at this level while also providing information about Immersion SAEs so that they could expand their projects in the future.

Regarding career development, multiple participants reported incorporating an agricultural career unit into their curriculum to raise students' awareness about potential SAEs and possible career pathways. Participant #9 reported that such activities helped "match students with something that they already do" to explore potential future careers so that they could expand on their interests and begin brainstorming about SAEs in the future. These activities required students to discover average salaries, educational and training requirements, and work-related tasks – key learning milestones associated with Foundational SAEs. Participant #10 noted that students "have to get on some sort of path" and that teachers are "preparing them for future careers." Participant #10 continued: whether students are completing a "career research project" or working on a "project at home," they should be doing innovative projects based on their interests. Consequently, by helping students understand what they could achieve in the future through their SAEs, the middle school agricultural education teachers in this study appeared to gain student buy-in and set the stage for more impactful learning opportunities later in their students' academic careers.

Theme #2: Competition as a Method of Instruction

After obtaining student buy-in, the middle school agricultural education teachers stressed the importance of using competition as a method of instruction to encourage students to achieve their goals. Goal setting has been advanced as an important aspect of the self-regulated learner (Zimmerman, 2008). As such, students should learn about setting challenging yet attainable goals to achieve quality learning outcomes. Through the lens of self-regulated learning theory, goals and external awards for achievement can enhance students' self-efficacy on a given topic (Zimmerman, 2008). In the current investigation, the middle school agricultural teachers appeared to capitalize on the sentiment of self-regulated learning by using competition as a method of instruction to facilitate quality learning for their students engaged in SAEs. Case in point, every participant in this study mentioned the deep-rooted connection between SAE programs, FFA proficiency awards, and FFA membership degrees. When introducing the concept of SAEs to their students, multiple teachers reported using the National FFA Proficiency Award Program categories to set the context and establish the purpose and function of quality SAEs. On this point, Participant #9 explained: "I start out with the broad category of the proficiency or SAE area, break it down, [and explain] what [the students] can do. What proficiency area do they belong in?"

Although the teachers used awards as motivation for completing successful SAE programs, Participant #8 expressed a concern that there were "no achievement [awards]" for middle school FFA members at the national FFA level for SAE programs, except for the National FFA Agriscience Fair program. However, Participants #1, #2, #3, and #4 reported that their states have begun recognizing high-quality SAE programs for middle school students. Participant #3 noted: "In Georgia, we do a record-book

competition, which is similar to a proficiency competition. It's just oversimplified to a great degree." Similarly, Participants #1 and #2 discussed the development of a State FFA Star Award for middle school SAE programs. In addition, Participants #6, #7, #8, and #9 incorporated a recognition program at the local level to celebrate middle school SAEs.

Additionally, some teachers used their school facilities to foster a competitive environment to facilitate quality student learning through SAEs. For instance, animal science laboratories and the use of "show teams" was mentioned by Participants #4, #5, and #6. When asked how SAEs were introduced into their program, Participant #5 reported: "the big [SAE program] in [State] is showing livestock." Participant #5 continued: "I'm in charge of the swine program here at [School District], and we split the other [species]. My teaching partners are in charge of sheep and goats." The teachers also voiced how the competitive nature and financial awards received through livestock shows influenced students' engagement with livestock-based SAE projects. On this point, Participant #4 reported: "[The students] actually get a lot of money. I just distributed $1,200, or something like that, [to the students] just by submitting [livestock] fair projects for free." The middle agricultural education teachers in this investigation also reported using competition guidelines as a learning tool to have their students complete agricultural mechanics projects and submit them for competitive events. As a result of this competition-driven instructional approach, the participants reported that their students' passion for expanding their knowledge grew as their SAEs expanded.

Theme #3: Goal-Driven Learning Outcomes

As a result of middle school teachers' use of competition as an instructional approach to facilitate quality student learning in SAEs, they voiced multiple positive learning outcomes for their students. The participants largely attributed these outcomes to using goal setting and competition to motivate students to engage in learning experiences more profoundly through SAEs. Learning outcomes derived from goals have been shown to help self-regulated learners develop competence in key subject areas (Zimmerman, 1998). Although the overarching goal of the students' SAEs, as articulated by the teachers in this study, was to obtain quality learning through achievement-based goals, multiple participants suggested that they also sought to "develop good people" (Participant #4, #6, and #9) through crucial learning experiences in SAEs. The teachers reported that they observed this outcome by witnessing their students' academic and personal growth throughout their SAE projects.

Although most teachers reported that their middle school students' SAEs occurred in class, Participants #2, #4, and #6 perceived that the students began to see greater "connection[s] to agriculture" and a "connection to the real world" through SAE projects. To illustrate, Participant #6 shared that students have taken the knowledge learned from agriscience research SAE projects and incorporated such into other SAE projects. These connections appeared to increase students' commitment to their SAE because it was "based on student interest," as expressed by Participants #3, #6, #9, and #10. As students continued to learn through their SAEs, the middle school teachers noticed that students' "pride" for their work and "ownership" increased (Participants #7 and #9). Consequently, Participant #3 and Participant #10 noticed that the students would often begin "talking about" their SAEs with peers, and a sense of community would grow in the agricultural education classroom and school. When discussing how student SAEs were showcased, Participant #3 reported: "I hang the [SAE] posters in the hallway, and our teachers, as they come by during transition [periods], they're like, 'How are you putting these [SAE posters] up every day? It seems like every day I see a different [SAE poster].' That kind of has a positive effect on the school. The [students] rally behind each other." In addition, Participant #6 mentioned that school administrators and core-content classes noticed growth among students who participated in agriscience research projects.

Multiple middle school teachers reflected on current and former students whose middle school SAE programs launched their future careers. Case in point, Participant #8 explained that because of the "exploration" component of their SAEs at the middle school level, their former student found a passion for

something "unique" that they enjoyed and built into a business. Participant #10 provided an example of a student with a learning disability who overcame communication issues while building a relationship with their teacher through their SAE program. The participant noted that the student "barely talk[ed] at school," and the student's speech therapist told the teacher, "[the student] doesn't have a problem when talking to you. I mean, I've been talking to him for a while, but get [the student] talking about chickens and gardens, and [the student] just takes off." Therefore, the teachers witnessed how SAE programs changed students' lives and saw SAE as an investment into their future. To accomplish this, the middle school teachers expressed that accountability through documentation, grading, and SAE supervision was essential to successful learning through SAEs.

Theme #4: Accountability for Student Learning

Zimmerman (1998) argued that the self-reflective process was essential to self-regulated learning because it allowed students to assess if they achieve their goals, master the required content, and adjust their strategies for proper goal attainment. The middle school agricultural education teachers in this investigation reported a variety of methods for monitoring student performance in SAEs to hold their students accountable for learning. To support this notion, Participant #6 provided a grading rubric they used to monitor students' progress, learning expectations, and project requirements for research-based SAEs (see Figure 2). To ensure learning rigor and maintain high-quality SAE projects, the middle school agricultural education teachers employed various record-keeping approaches to encourage students to acquire essential data management and analysis skills. However, the delivery of record-keeping looked different for each participant.

Figure 2

Research-Based SAE Grading Rubric (Participant #6)

Fall Grade – Due December 16th

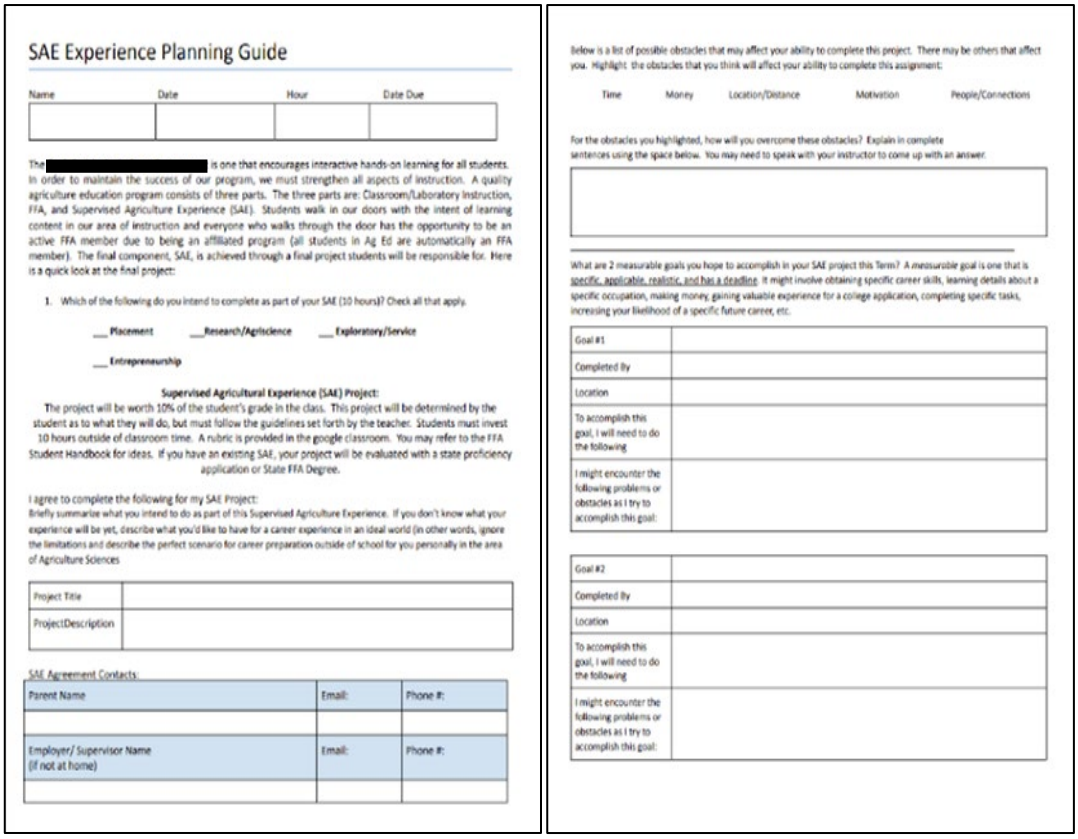
Criteria	Points Possible	Points Earned
Question: Needs to be in question form	10 Points	
Hypothesis: Includes words "if" "then" "because"	15 Points	
Hypothesis: Serves as an educated guess	10 Points	
Independent Variable: Includes what you changed	10 Points	
Dependent Variable: Includes what you measured	10 Points	
Other's Studies: Includes 2 studies that you looked at	25 Points	
Other's Studies: Lists what you learned from each study	25 Points	
Materials: List EVERY material that you used	10 Points	
Procedure: List Every Step in the Project	25 Points	
Procedure: I could replicate the project using this section	25 Points	
My Data: Uses one graph	40 Points	
My Data: Uses one table in addition to the graph	40 Points	
My Data: Graph and Table are neat and easy to read	10 Points	
My Conclusion: Tell if you accept or reject hypothesis	25 Points	
My Conclusion: Tell what future studies could be done	10 Points	
My Conclusion: Uses at least 75% of that section	10 Points	
Total Points Received	300 Points	

Participants #1, #2, #5, #6, #7, #8, #9, and #10 utilized The Agricultural Experience Tracker (AET) as a data management system, while Participants #3 and #4 reported using SAE record books that aligned with their state's criteria for awards. Data management and analysis often occurred on "AET Fridays," when class time was provided to allow students time to update their SAE records (Participant #5). Participant #6 incorporated "SAE Work Nights," which allowed students to work on their agriscience research records after school hours. Further, middle school students were held accountable for their SAEs as a graded component of their agricultural education course. Participants #1, #6, #7, #8, #9, and #10

indicated that SAEs were a graded component of their agricultural curriculum. Further, Participants #1, #7, #9, and #10 facilitated learning through exploratory career research projects in which students researched a career, created a presentation, and logged documentation of this experience into their appropriate data management system. Participants #7, #9, and #10 required documentation of SAEs through student submitted photographs. Figure 3 demonstrates how Participant #6 leads students through planning their SAE at the middle school level.

Figure 3

SAE Experience Planning Guide (Participant #9)



SAE Experience Planning Guide

Name | Date | Hour | Date Due

The [redacted] is one that encourages interactive hands-on learning for all students. In order to maintain the success of our program, we must strengthen all aspects of instruction. A quality agriculture education program consists of three parts. The three parts are: Classroom/Laboratory Instruction, FFA, and Supervised Agriculture Experience (SAE). Students walk in our doors with the intent of learning content in our area of instruction and everyone who walks through the door has the opportunity to be an active FFA member due to being an affiliated program (all students in Ag Ed are automatically an FFA member). The final component, SAE, is achieved through a final project students will be responsible for. Here is a quick look at the final project:

1. Which of the following do you intend to complete as part of your SAE (10 hours)? Check all that apply.

___Placement ___Research/Agriscience ___Exploratory/Service

___Entrepreneurship

Supervised Agricultural Experience (SAE) Project:

The project will be worth 10% of the student's grade in the class. This project will be determined by the student as to what they will do, but must follow the guidelines set forth by the teacher. Students must invest 10 hours outside of classroom time. A rubric is provided in the google classroom. You may refer to the FFA Student Handbook for ideas. If you have an existing SAE, your project will be evaluated with a state proficiency application or State FFA Degree.

I agree to complete the following for my SAE Project:
Briefly summarize what you intend to do as part of this Supervised Agriculture Experience. If you don't know what your experience will be yet, describe what you'd like to have for a career experience in an ideal world (in other words, ignore the limitations and describe the perfect scenario for career preparation outside of school for you personally in the area of Agriculture Sciences

Project Title	
ProjectDescription	

SAE Agreement Contacts:

Parent Name	Email:	Phone #:
Employer/ Supervisor Name (if not at home)	Email:	Phone #:

Below is a list of possible obstacles that may affect your ability to complete this project. There may be others that affect you. Highlight the obstacles that you think will affect your ability to complete this assignment:

Time Money Location/Distance Motivation People/Connections

For the obstacles you highlighted, how will you overcome these obstacles? Explain in complete sentences using the space below. You may need to speak with your instructor to come up with an answer.

What are 2 measurable goals you hope to accomplish in your SAE project this Term? A measurable goal is one that is specific, applicable, realistic, and has a deadline. It might involve obtaining specific career skills, learning details about a specific occupation, making money, gaining valuable experience for a college application, completing specific tasks, increasing your likelihood of a specific future career, etc.

Goal #1	
Completed By	
Location	
To accomplish this goal, I will need to do the following	
I might encounter the following problems or obstacles as I try to accomplish this goal:	

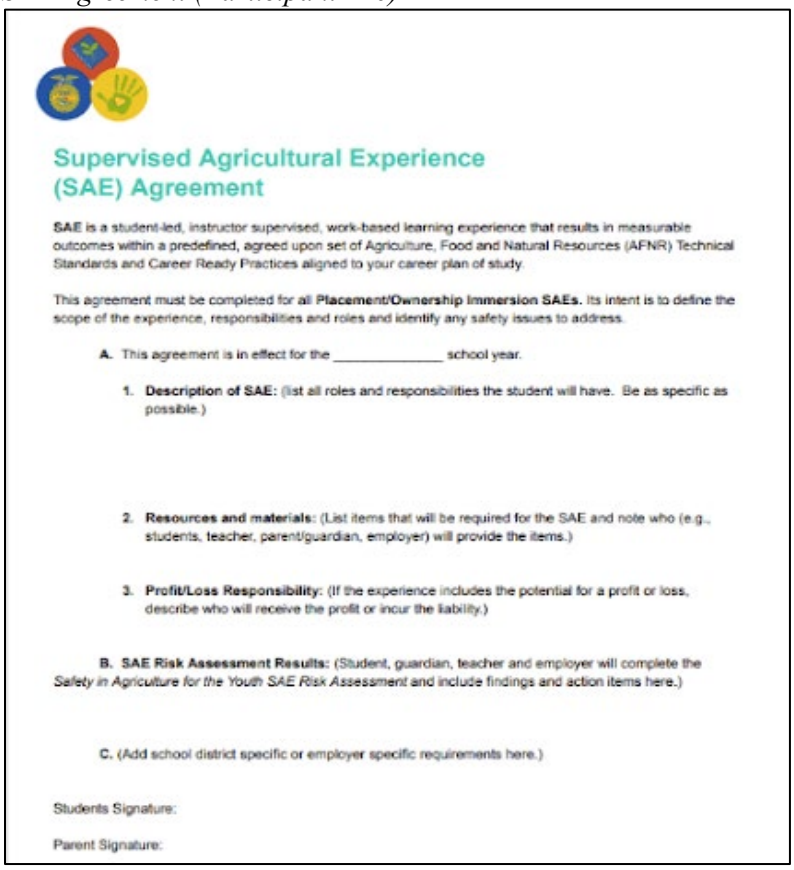
Goal #2	
Completed By	
Location	
To accomplish this goal, I will need to do the following	
I might encounter the following problems or obstacles as I try to accomplish this goal:	

Zimmerman (1998) noted that learners evaluate their performance with feedback. Therefore, teachers should periodically assess students' progress and provide feedback to determine whether learning goals have been reached. On this point, Participant #4 explained: "I require [the students] to do certain checkpoints throughout [the year]. [The SAE] starts in August, so by September, they have to talk about why they're doing [their SAE], what they're doing… and a step-by-step [explanation of how they are going to do it]. Because I want them to document their experiences." Further, the middle school teachers in this investigation reported assessing their students' SAE projects through regular site visits. Participants #4, #5, #9, and #10 also reported on parental involvement through SAE agreements, SAE meetings for parents, or SAE visits with parental engagement. On this topic, Participant #10 provided an 'SAE Agreement' document that required students to describe their SAE plan, develop an SAE risk assessment, and obtain parent signatures to begin work on their SAE programs (see Figure 4). Further, the middle school teachers completed SAE visits on-site with students, in the classroom, or through various learning laboratories provided through their school system. Participant #4 explained that breeders who sold livestock to students were also used as resources to provide expert knowledge to enhance students' learning and as an additional

strategy to hold students accountable for their learning. It should also be noted that Participants #3, #6, #9, and #10 included a classroom presentation as a summative assessment of student learning. This presentation was to evaluate students' progress and learning for their chosen SAE. "Sharing their projects," Participant #10 stated: "it kind of helps the kids. It helps them see what other kids are interested in… and sparks some ideas for them and some other interests."

Figure 4

SAE Agreement (Participant #10)



Supervised Agricultural Experience (SAE) Agreement

SAE is a student-led, instructor supervised, work-based learning experience that results in measurable outcomes within a predefined, agreed upon set of Agriculture, Food and Natural Resources (AFNR) Technical Standards and Career Ready Practices aligned to your career plan of study.

This agreement must be completed for all **Placement/Ownership Immersion SAEs.** Its intent is to define the scope of the experience, responsibilities and roles and identify any safety issues to address.

A. This agreement is in effect for the _____ school year.

1. **Description of SAE:** (list all roles and responsibilities the student will have. Be as specific as possible.)
2. **Resources and materials:** (List items that will be required for the SAE and note who (e.g., students, teacher, parent/guardian, employer) will provide the items.)
3. **Profit/Loss Responsibility:** (If the experience includes the potential for a profit or loss, describe who will receive the profit or incur the liability.)

B. SAE Risk Assessment Results: (Student, guardian, teacher and employer will complete the *Safety in Agriculture for the Youth SAE Risk Assessment* and include findings and action items here.)

C. (Add school district specific or employer specific requirements here.)

Students Signature:

Parent Signature:

Theme #5: Challenges to Facilitating Student Learning in Middle School SAEs

Despite the benefits of SAE programs, the middle school teachers in this investigation experienced several challenges that they perceived affected their ability to facilitate quality learning for middle school students engaged in SAEs. For example, Participant #4 indicated that "SAEs [were] time-consuming." A significant reason for this was that the middle school agricultural education teachers in this study reported varying instructional time with the students, ranging from nine weeks to a full year. On this note, Participant # 2 indicated: "I don't have a lot of time, considering we are on a marking period schedule… Once [the students] get to high school, and [the students] have the teachers all year round, they can dive deeper into their SAE program." To maximize classroom time, however, Participant # 8 incorporated a group SAE project in which the middle school students read Farm Bureau's *Book of the Year* and created educational activities based on the book to improve elementary students' agricultural literacy. Upon completion of the project, students documented their experiences in AET.

Because of additional responsibilities assigned to middle school agricultural education teachers,

SAEs were another item on their already full plate. Participant #4 explained: "I'm expected to advise [students' SAEs] …my role has evolved from that, too. But I also have the responsibility of all the other components of the program." Further, the middle school agricultural education teachers struggled to decide when to begin students on their SAE journey. Participant #8 shared: "We really don't even talk about it as a unit until their 8th-grade class. Similarly, Participant #10 noted that students cannot start SAE programs too soon; otherwise, "it leads to some confusion down the road when they apply for awards" because "they cannot include any of their SAE project hours until they [are] in 7th grade [in their state]." Therefore, Participant #10 only required SAEs for 7th and 8th Grade students. Meanwhile, Participants #1, #3, #4, and #7 indicated incorporating SAEs in 6th Grade. However, Participant #8 felt 6th Grade was too young for students to begin an SAE project.

The teachers also noted that middle school students struggled to grasp the conceptual nature of SAEs. As a result, they perceived that middle school students often required heavy teacher guidance because they "lack[ed] the independent skills" (Participant #4) to complete SAEs in ways that high school students would. For example, Participant #8 argued that SAEs were a "very abstract concept for 8th graders." Because middle school has historically been the entry point for students entering the agricultural education program, these students "don't have the skillset" or "ability" to meet the learning demands required for Immersion SAEs (Participant #8). Further, multiple participants mentioned the age of middle school students affected their ability to engage in placement SAEs. On this point, Participant #6 commented: "Our big employers of FFA members aren't going to hire [the students] until they're 16. Therefore, we have more entrepreneurship SAEs, where students are raising livestock and showing livestock." Nevertheless, the middle school agricultural education teachers believed that SAEs had value and encouraged their students to engage in them through self-regulated learning.

Conclusions

The purpose of this study was twofold: (1) to explain how middle school agricultural education teachers have successfully facilitated learning through SAE programs, and (2) to describe best practices for SAE programs at the middle school level. In this study, findings emerged through five themes: (1) an eye toward the future, (2) competition as a method of instruction, (3) goal-driven learning outcomes, and (4) accountability for student learning, and (5) challenges in facilitating learning in middle school SAEs. Therefore, we conclude that based on the data provided by participants in this investigation, SAE can be an integral component of student learning at the middle school level. To accomplish this, the middle school teachers in this study used a future-oriented mindset toward SAEs to set a foundation for their students' learning trajectories, including preparing them for high school expectations and their potential career interests. We conclude that foundational SAEs served as critical component of a middle school student's SAE journey and that participation in this type of program bolstered students as they set goals and worked toward achieving them. This finding was supported by the work of Eck and Davis (2024), who suggested that SAEs at the middle school level must meet students at their unique levels of maturity and exposure. The middle school teachers in this study scaffolded student experiences to help them advance into more complex SAE programs later in their academic careers. These types of SAE experiences appeared to allow middle school students to explore potential careers based on their interests. Further, the teachers in this study included goal setting as a critical learning component in SAEs. This corroborated the findings of Rubenstein and Thoron (2014), who reported that goal planning and learning were critical to successful SAE programs and strengthened career choices. The teachers in this investigation also embraced the diverse interests of students and conducted unique projects to facilitate their learning.

Supported by the work of Jones and Edwards (2019), the second theme described how the teachers used competition to build motivation for student learning. To accomplish such, the middle school teachers reported using the National FFA Proficiency Award Program to expose students to the diverse opportunities available in SAE programs. This award program, along with membership degrees and the Agriscience Fair,

could serve as external motivators for student participation (Bird et al., 2013). Content and curricular resources provided by the AET were also utilized to teach students about successful record-keeping and data management. Further, teachers used livestock shows, agricultural mechanics shows, record book competitions, agriscience research, and FFA membership degrees to further illuminate the value of SAE programs for students. The teachers also reported creating awards for high-quality middle school students at the local level to recognize students who learned through the use of competition as a method of instruction.

In theme three, goal-driven learning outcomes, the middle school teachers discussed the learning attributes and personal growth that students achieved through setting goals to achieve positive outcomes. In the literature, Doss and Rayfield (2021) reported that administrators believed that involvement in FFA and SAE was important. Similarly, the teachers noted that administrators and core content teachers noticed the growth of students who engaged in learning through SAE. Although the goal was to have students experience learning through high-achieving SAE programs, connections were also made to the agricultural industry – a finding supported by the work of Ramsey and Edwards (2012). According to the middle school teachers, students with livestock-based SAEs were reported to obtain the most significant personal growth. As such, we conclude that middle school students can achieve skill attainment through participation in more immersive SAEs (NCAE, 2017). Traits such as pride, ownership, and professional growth also emerged as positive outcomes (Thiel & Marx, 2019).

Emergent findings also revealed that the teachers in this study held students' learning accountable through their SAE projects. From the middle school teacher's perspective, accountability was essential to the success of high-quality SAEs. For instance, the teachers employed various methods to have students document their SAE program, such as SAE record books, whether through AET or paper records, to track their progress. Through this process, these middle school teachers reported that their students tracked time, finances, and skills, most of which were graded. On this point, Bryant et al. (2022) illuminated that when students received grades for their involvement in SAEs, they were more likely to be motivated to develop a competent project. The teachers reported using photo documentation as evidence to support that students were completing high-quality SAE programs. Further, they completed on-site or in-class supervision to evaluate their students' experiences. Finally, some of their students collaborated with experts to monitor the progress of livestock-based SAEs.

Similar to Eck and Davis (2024), who examined barriers to the successful implementation of SAEs at the middle school level, the teachers in this investigation expressed challenges concerning successfully facilitating student learning in SAEs. Time was a major factor regarding whether SAEs would be successful for many middle school teachers. In this study, we also found that instructional time varied from nine weeks to one year of instruction and varied from block schedules to daily student engagement over an academic year. The middle school teachers in this study also expressed concerns regarding when to begin their middle school students with SAE projects to not confuse students on future award applications and competitions in FFA. We also conclude that the teachers in this study perceived that SAEs were hard to conceptualize for middle school students, and as a result, they often did not have the wherewithal to complete overtly complex projects independently – a concept not previously explored in the literature on middle school SAEs. Finally, teachers in this investigation reported limited awards for middle school students' SAE programs, which impacted their ability to motivate their students to engage in high-quality student learning.

Discussion, Implications, Limitations, and Recommendations

Self-regulated learning appears to have been intimately intertwined with SAE programming at the middle school level (Zimmerman, 1998, 2008). The middle school teachers in this investigation facilitated self-regulated learning's using three core components (1) forethought, (2) performance, and (3) self-reflection. Self-regulated learning is a strategy that teachers should continue to employ as they guide their students through achievement-focused learning outcomes in SAEs using proficiency awards, agriscience fair, and FFA membership degrees as motivators. Understanding how teachers have facilitated learning

through SAE was vital to reimagining middle school agricultural education programs in the future. For example, this study illuminated how exemplary middle school teachers used competition as a method of instruction to deepen their students' learning. Despite this, livestock-based and career exploration emerged as two of the most frequently reported SAE types for middle school students among the exemplary teachers in this study. Although focusing on careers can be valuable for students, could this practice be too heavily emphasized at the middle school level? Perhaps having middle school students expand into additional SAE types could improve students' knowledge and motivation before entering high school.

As such, we recommend that an evaluation be conducted regarding the importance of career exploration versus agricultural literacy and skill development in SAEs at the middle school level. This knowledge could help reposition the discipline to create a more accurate framework that guides the facilitation of high-quality learning for middle school SAEs (Figland et al., 2020). Future research should also explore establishing indicators of high-quality SAE programs to elucidate best practices for middle school SAEs. Because the length of instruction varied between states, paired with inconsistencies of when teachers see students during the school week, we recommend that future research on SAEs at the middle school level examine whether a program (i.e., lasting more than one year) or a project (i.e., lasting less than one year) approach would be more appropriate. Perhaps emphasizing projects rather than programs could make the planning and delivery of middle school SAEs for teachers more manageable. Further, this change could allow teachers to expose students to multiple SAE projects while still focusing on high-quality instruction and other duties. Examples could include in-class, cooperative, independent, or service-learning SAE projects. Future research should also examine the diverse SAE project types that middle school teachers could use to facilitate quality student learning and how the existing *SAE for All* framework could be modified for middle school SAE projects.

The findings of this study suggested that greater emphasis should be placed on SAE and data management to better prepare preservice teachers to facilitate SAE programs at the middle school level. Previous research has shown that when preservice teachers engaged in project-based projects related to SAE management, they experienced growth and self-confidence in facilitating and evaluating student SAEs (Roberts & Robinson, 2018). In addition, Hainline and Smalley (2021) noted that preservice teachers in Iowa expressed needs regarding SAE development and management. Therefore, we recommend that teacher educators incorporate SAE and data management into their teacher preparation programs through hands-on engagement (Roberts et al., 2020a, 2020b). Teacher educators should also consider developing courses focused more explicitly on SAE development, implementation, and assessment.

Based on the findings of this investigation, we recommend that AET, and other SAE data management systems, explore creating a developmentally focused data management and record-keeping option for middle school students. On this point, teachers in this investigation espoused that SAE was already too abstract for their students to grasp, especially regarding data management and record keeping. This change in approach could streamline the ease by which students are exposed to SAE record keeping and documentation. Finally, supported by work of Eck and Davis (2024), the National FFA Organization and state associations should consider ways by which to recognize and celebrate exemplary middle school SAE projects and programs (Englin et al., in press). If all students are expected to complete an SAE, and proficiency awards are based on them, then middle school students should be granted the same opportunity (Traini et al., 2023).

In this investigation, we used previously reported literature (Jones et al., 2020) to identify the states with this highest middle school agricultural education enrollment and middle school FFA membership, which included (1) Georgia, (2) Florida, (3) Virginia, (4) Missouri, (5) Delaware, (6) Oklahoma, and (7) Wisconsin. We recognize that additional states may provide agricultural education to middle school students, however, our intent was to provide an overview of the practices of exemplary teachers in states in which middle school agricultural education was most prominent. We understand that this served as a limitation to this study. As such, the findings of this

investigation may not be transferable to all middle school SBAE programs across the U.S.

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